

REMARKS

Claims 1-68 are pending. No new matter has been added by way of the present amendment. For instance, claim 1 has been amended to indicate that the adhesion or attachment of cells in the sample liquid on the coating of the microchannel is assessed dependent on the shear stress or controlled flow rate to which the sample liquid is subjected. Support for this limitation may be found in the originally filed claims, the Summary of the Invention, as well as in other areas within the disclosure, for instance, reference is made to page 13, lines 16-22 and page 16, line 28 to page 17, line 2. The claims have also been amended to clarify the "other" microchannel as a "second" microchannel. Claims 7 and 19 have also been amended to correct minor typographical errors. Accordingly, no new matter has been added.

In view of the following remarks, Applicants respectfully request that the Examiner withdraw all rejections and allow the currently pending claims.

Issues under 35 U.S.C. § 112, second paragraph

The Examiner has rejected claims 6-14 and 19 under 35 U.S.C. § 112, second paragraph for the reasons recited at page 4 of the outstanding Office Action. Applicants respectfully traverse.

The Examiner has rejected various limitations in claim 6. However, claim 6 (and other claims containing similar language) has been clarified so as to indicate that in one embodiment of the present invention, a reagent liquid is delivered through a second microchannel connected to the elongate enclosed microchannel (the microchannel recited in claim 1). Moreover, these microchannels are connected intermediate their ends by an interconnecting channel.

The Examiner has also noted a possible typographical error in claim 19. Applicants submit that this inadvertent typographical error has been corrected.

Accordingly, the presently pending claims are fully definite. Reconsideration and withdrawal of these rejections is respectfully solicited.

Issues under 35 U.S.C. § 102(a)

The Examiner has rejected claims 1, 2, 5 and 17 under 35 U.S.C. § 102(a) as being anticipated by Chen (US 2002/0182633 A1).¹ Applicants respectfully traverse.

Independent claim 1 of the present invention relates to a biological assay method comprising: preparing a sample liquid of a suspension of animal cells; coating an internal bore of a biochip with a coating which promotes cellular adhesion, the biochip comprising an elongate enclosed microchannel with an internal bore; delivering the sample liquid at a controlled steady flow rate through the biochip; and examining the sample liquid over time to observe the effect of the coating on the sample; whereby the adhesion or attachment of cells in the sample liquid on the coating of the microchannel is assessed dependent on the shear stress or controlled flow rate to which the sample liquid is subjected.

¹ Applicants submit that the Chen (US 2002/0182633 A1) reference does not qualify as prior art under 35 U.S.C. § 102(a). This reference has a publication date of December 5, 2002, which is later than the priority date of December 29, 2000 to which the present application is entitled benefit under 35 U.S.C. § 120. The Chen U.S. application filing date of July 11, 2001 also falls after the December 29, 2000 filing date to which the present application is entitled benefit. Lastly, although a copy was not provided by the Examiner, the U.S. Provisional application (60/217,464) to which Chen claims priority, hypothetically qualifies as prior art under 35 U.S.C. § 102(e). However, there is no indication that the subject matter of U.S. Provisional application 60/217,464 is identical to that of the Chen publication relied upon by the Examiner. For purposes of this reply, Applicants distinguish the teachings of the Chen publication, but reserve the right to dispute priority of Chen to the U.S. Provisional application 60/217,464 filing date of July 11, 2000.

However, Chen fails to suggest or disclose the use of continuous flow as recited in claim

1. Chen merely states that in paragraph [0030] that:

the surface is brought into contact with a medium suspected of containing the biological molecule for a period of time sufficient to allow the biological molecule to bind to the surface.

This disclosure of Chen clearly differs to the present claims, which involve the coating of a microchannel (e.g., with a protein) and delivering a suspension of animal cells through this microchannel.

Furthermore, paragraph [0123] of Chen relates to a cell adhesion assay which involves the plating of hepatocytes or fibroblasts on various substrates. This assay does not involve the continuous flow of the sample liquid containing the cells as required by claim 1. On the contrary, the assay described in Chen involves measuring cell adhesion *in situ*. The reference to microchannels in claim 21 of Chen refers to areas of deposition of the biomolecule on the substrate. This differs from the microchannel of the present invention which enables the continuous flow of the suspension of animal cells. None of the passages of Chen cited by the Examiner disclose the concept of measuring cell adhesion or detachment under controlled and continuous flow.

In summary, Applicants respectfully submit that several patentable distinctions exist between the presently claimed subject matter and the disclosure of Chen. Accordingly, this rejection is improper and should be withdrawn.

The Examiner has also rejected claims 1-14 and 17-24 under 35 U.S.C. § 102(a) as being anticipated by Griffith (U.S. 6,197,575).² Applicants respectfully traverse.

Griffith discloses a micromatrix seeded with cells. This micromatrix is used in determining the effect of biological or chemical agents on the cells. However, Griffith neither suggests nor discloses continuous flow as required by the present claims. Also, as mentioned in claims 1 and 28 of Griffith, the method of Griffith relates to “perfusion of the cells with nutrients and oxygen sufficient to maintain the viability of the cells....”. This differs from the present claims which enable the continuous flow of a sample of animal cells through the microchannel.

Thus, Applicants respectfully submit that several patentable distinctions exist between the presently claimed subject matter and the disclosure of Griffith. Accordingly, this rejection is improper and should be withdrawn.

In view of the above, Applicants respectfully submit that the present claims define allowable subject matter. Accordingly, the Examiner is respectfully requested to withdraw all rejections and allow the currently pending claims.

If the Examiner has any questions or comments, please contact Craig A. McRobbie (Registration No. 42,874) at the offices of Birch, Stewart, Kolasch & Birch, LLP.

² Applicants submit that Griffith (U.S. 6,197,575) does not qualify as prior art under 35 U.S.C. § 102(a) since the grant date of this patent of March 6, 2001 is later than the priority date of December 29, 2000 to which the present application is entitled benefit under 35 U.S.C. § 120. However, Griffith does appear to qualify as prior art under 35 U.S.C. § 102(e) as of its U.S. filing date of March 18, 1999.


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If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to our Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. § 1.16 or under § 1.17; particularly, extension of time fees.

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Respectfully submitted,

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